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Huang

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(54) **CORD-WINDING DEVICE FOR A VENETIAN BLIND**

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E06B 9/322 (2006.01)

(52) **U.S. Cl.**
CPC ***E06B 9/322*** (2013.01); *E06B 2009/3225* (2013.01)

(58) **Field of Classification Search**
CPC .. E06B 9/322; E06B 9/325; E06B 2009/3222
USPC ..... 160/170, 171, 178.1 R, 173 R
See application file for complete search history.

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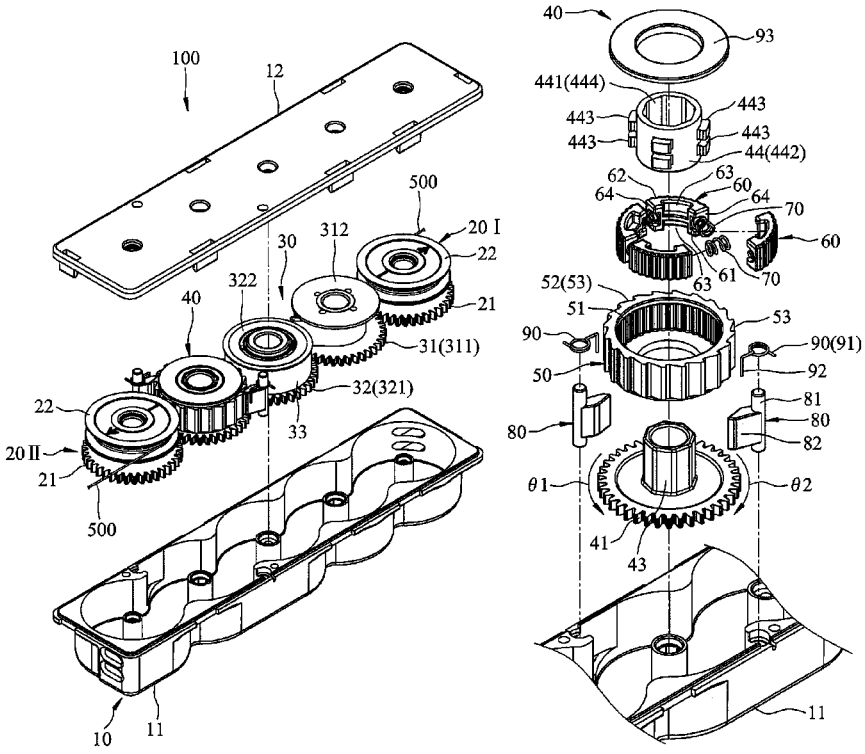
(57) **ABSTRACT**

A cord-winding device for a Venetian blind includes: a first reel; a driving unit including a driving wheel and a spring-winding wheel; and a brake unit including a driven gear, a driving member, a ratchet wheel sleeved on the driving member, a plurality of friction members disposed between the driving member and the ratchet wheel, and at least pawl biased to engage the ratchet wheel. When the driven gear is driven by the first reel to rotate in a direction, rotation of the ratchet wheel is stopped by the pawl so that the driving member drives the friction members to rotate, and when the driven gear is driven by the driving wheel to rotate in an opposite direction, the driving member drives rotation of the friction members and, thus, the ratchet wheel.

13 Claims, 16 Drawing Sheets



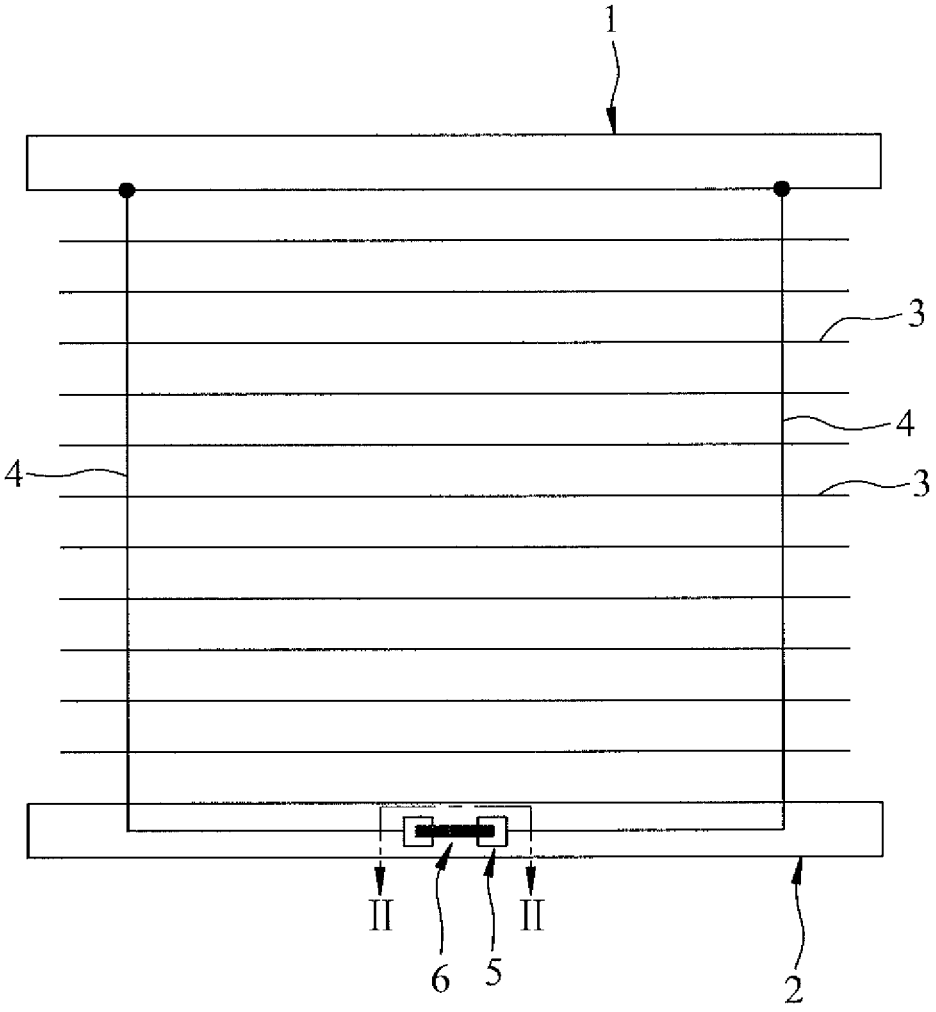


FIG.1
PRIOR ART

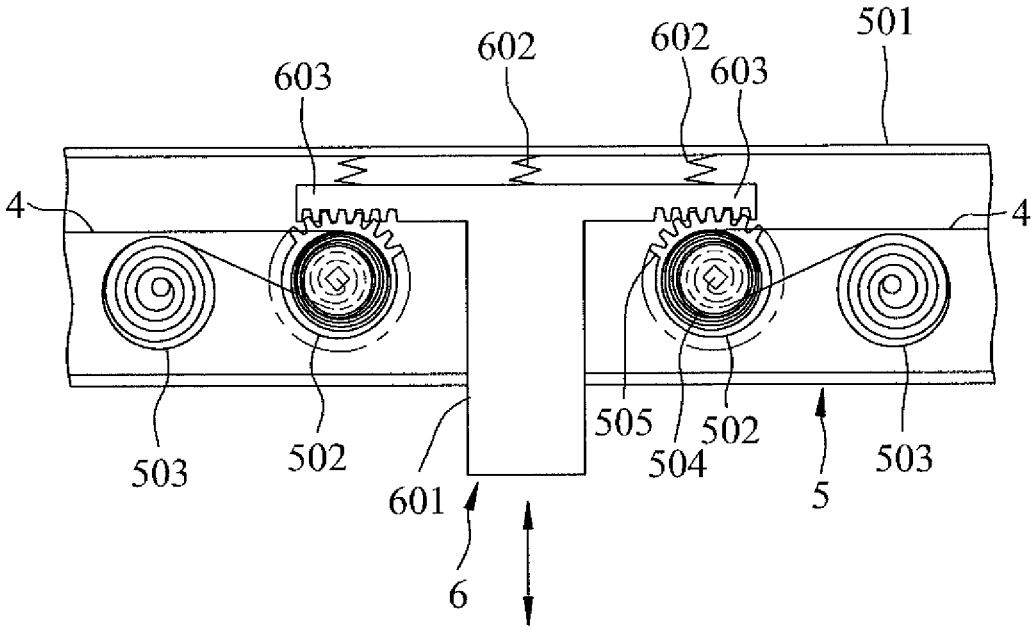


FIG.2
PRIOR ART

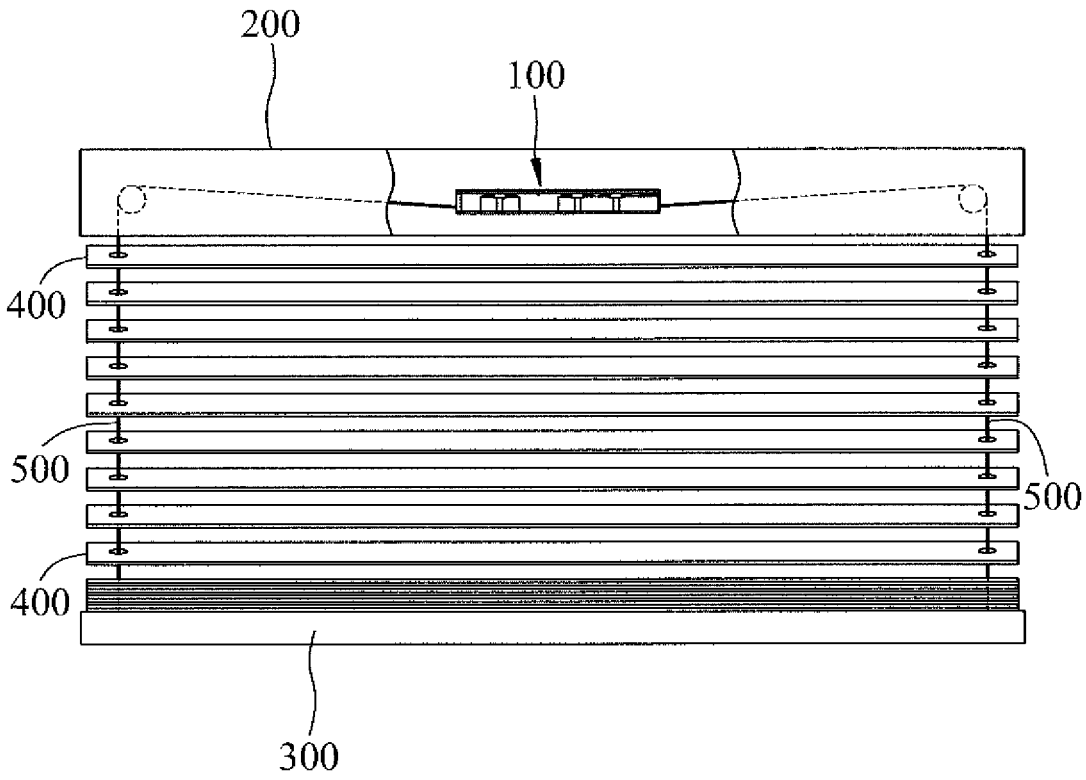


FIG.3

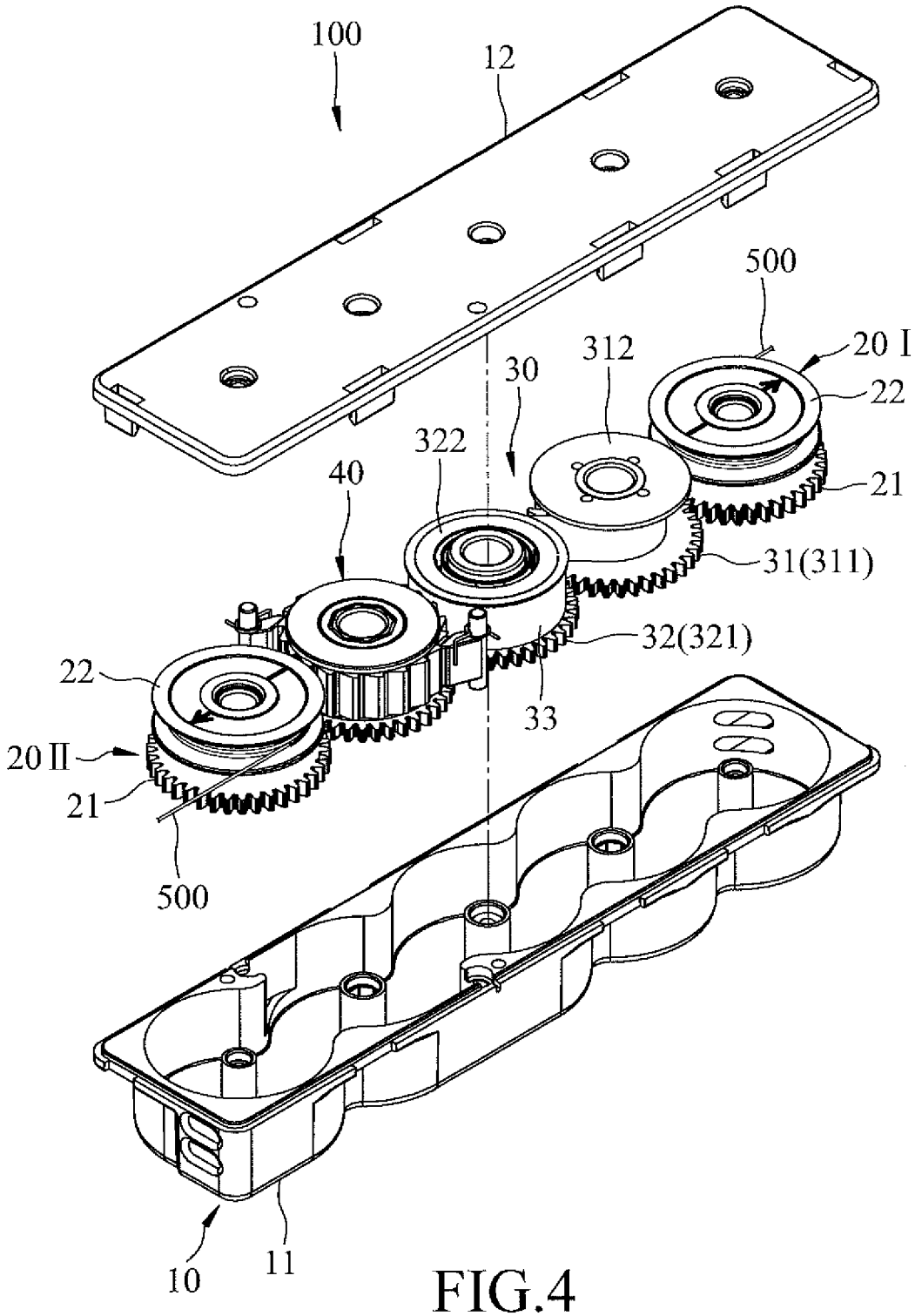

100
12
500
20 I
312
30
22
322
40
21
31(311)
32(321)
22
33
20 II
21
500
10
11

FIG.4

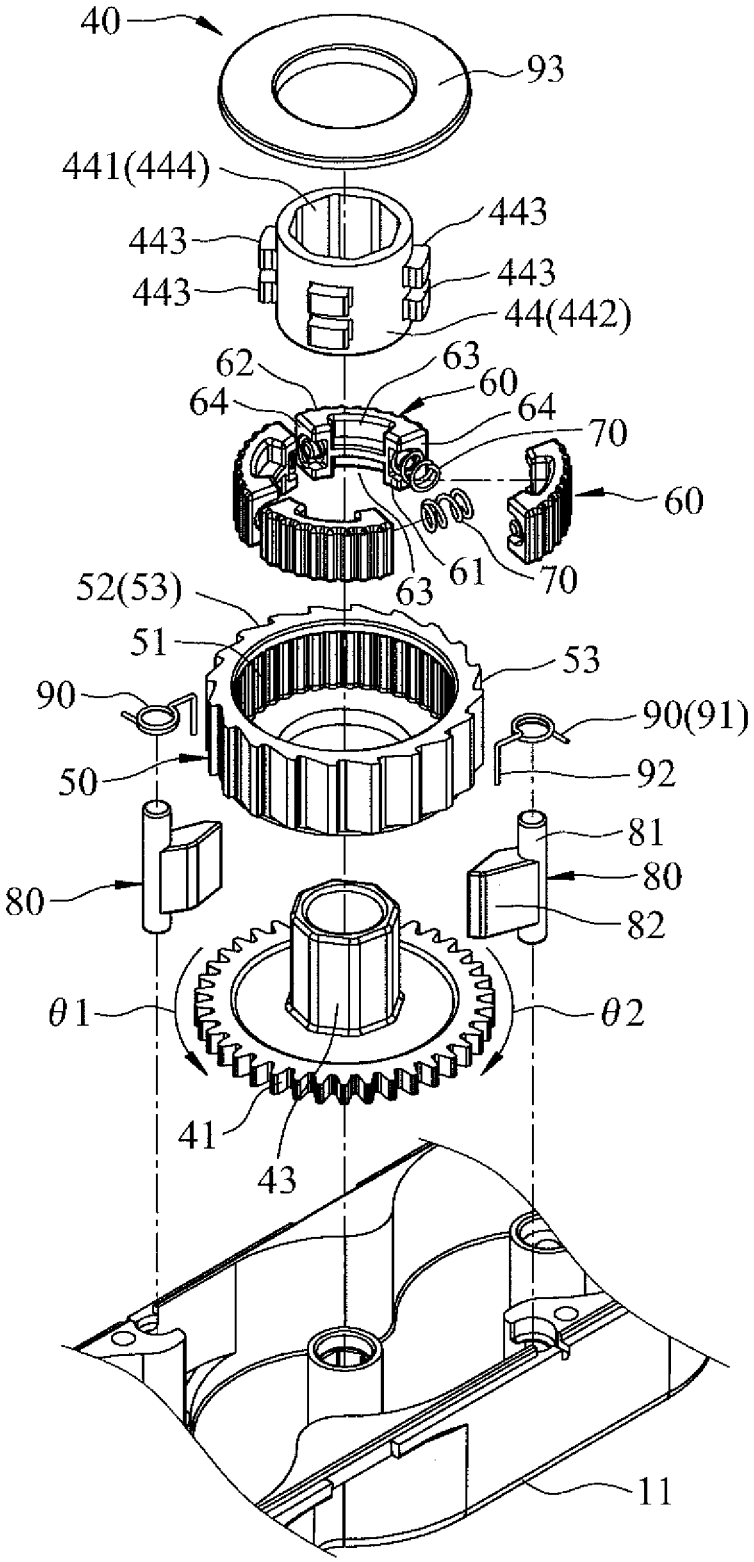

40
93
441(444)
443
443
443
443
44(442)
62
63
60
64
64
70
60
63
61
70
52(53)
51
53
90
90(91)
50
92
81
80
80
82
θ1
θ2
41
43
11

FIG.5

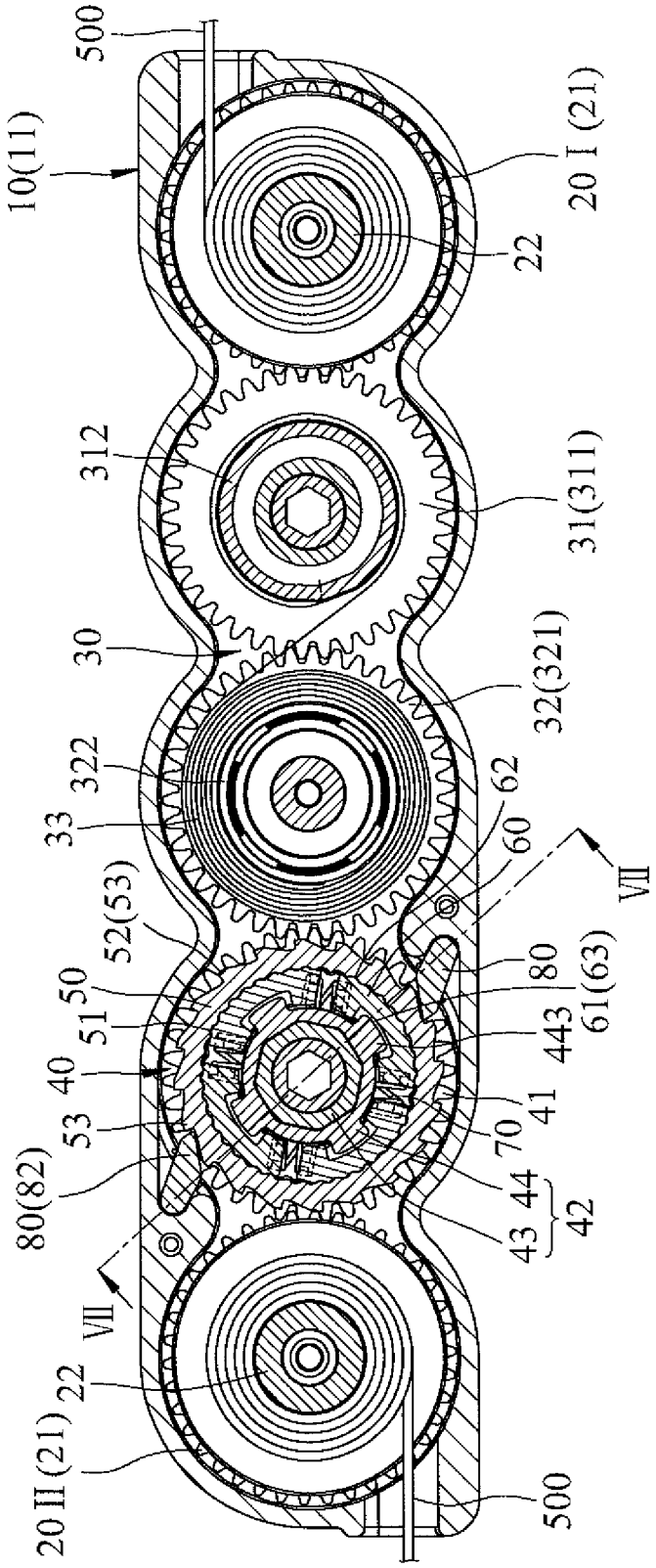

500
10(11)
20 I (21)
22
312
31(311)
30
32(321)
322
33
62
60
VII
52(53)
50
80
61(63)
51
443
40
41
53
70
80(82)
44
43
42
VII
22
20 II (21)
500

FIG.6

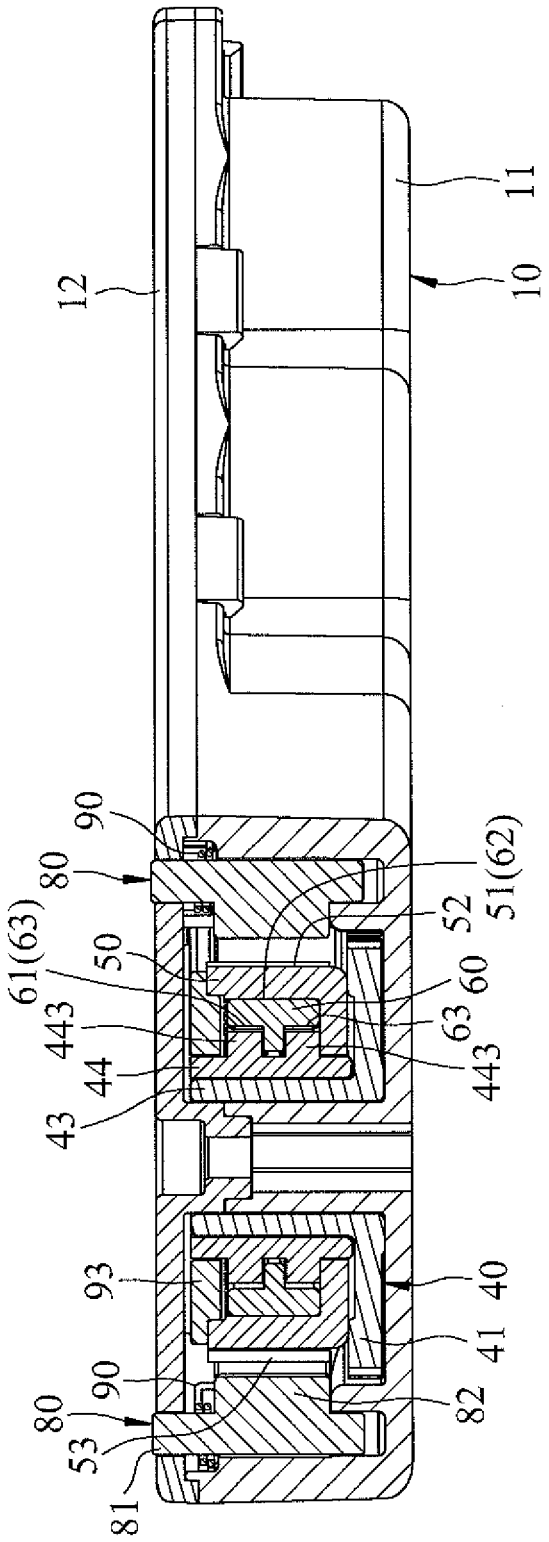

11
10
12
90
80
51(62)
52
61(63)
50
60
63
443
443
44
43
93
40
41
90
82
80
53
81

FIG.7

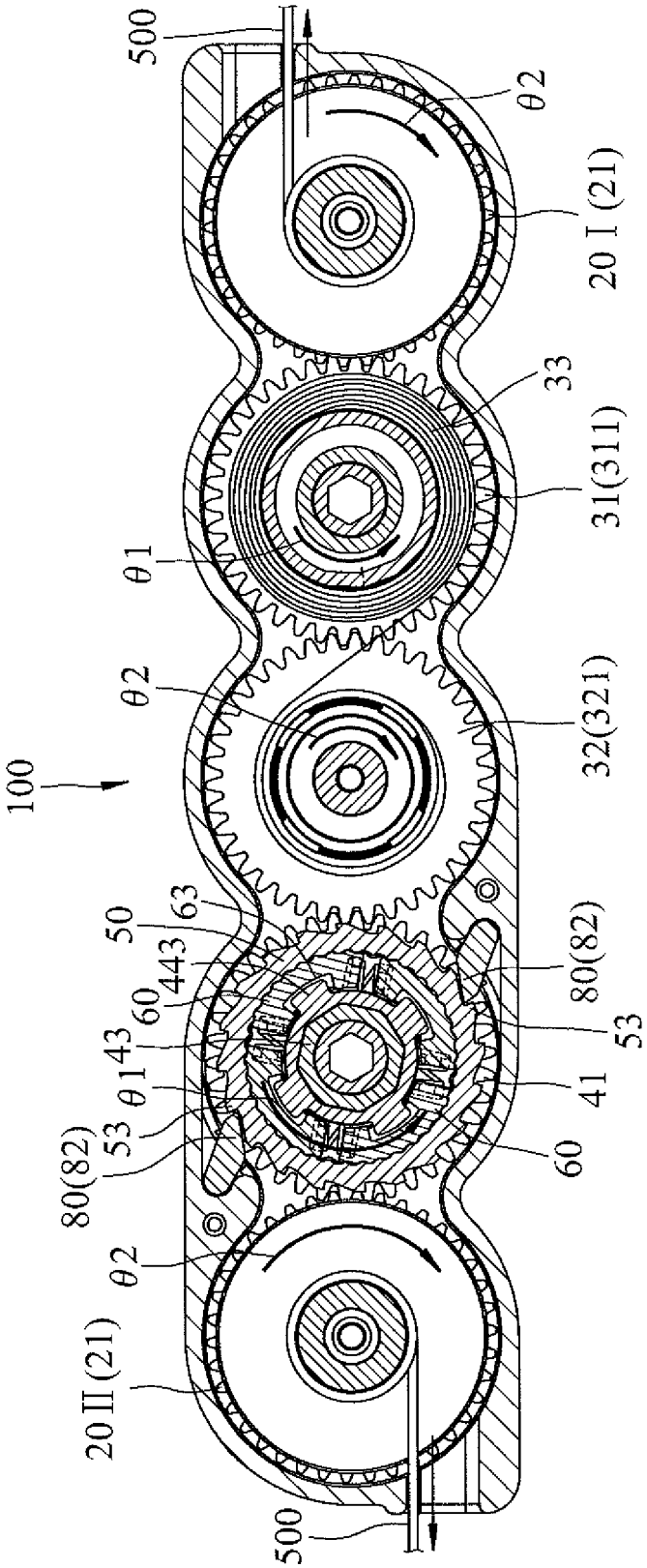

500
θ2
20 I (21)
33
31(311)
θ1
θ2
32(321)
100
50
63
443
60
43
θ1
53
80(82)
80(82)
53
41
60
θ2
20 II (21)
500

FIG.8

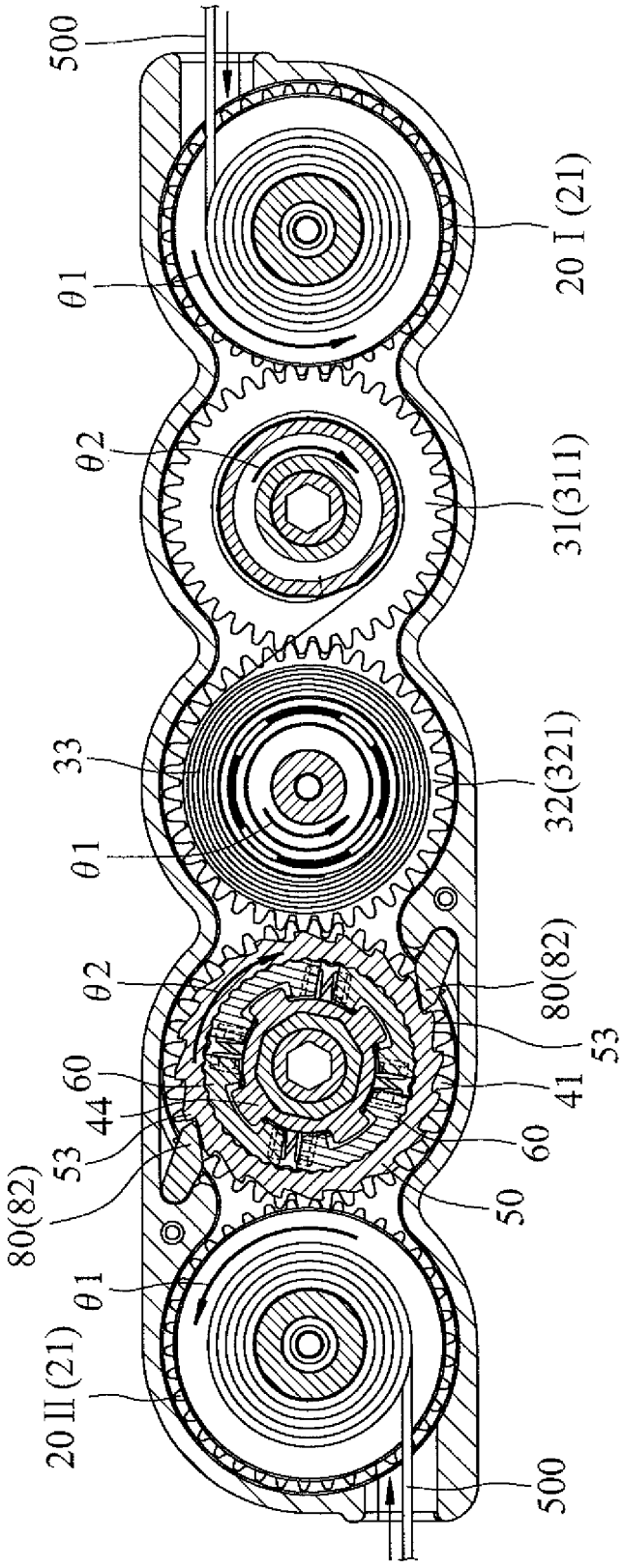

500
θ1
20 I (21)
θ2
31(311)
33
θ1
32(321)
θ2
80(82)
53
60
44
53
41
60
80(82)
50
θ1
20 II (21)
500

FIG.9

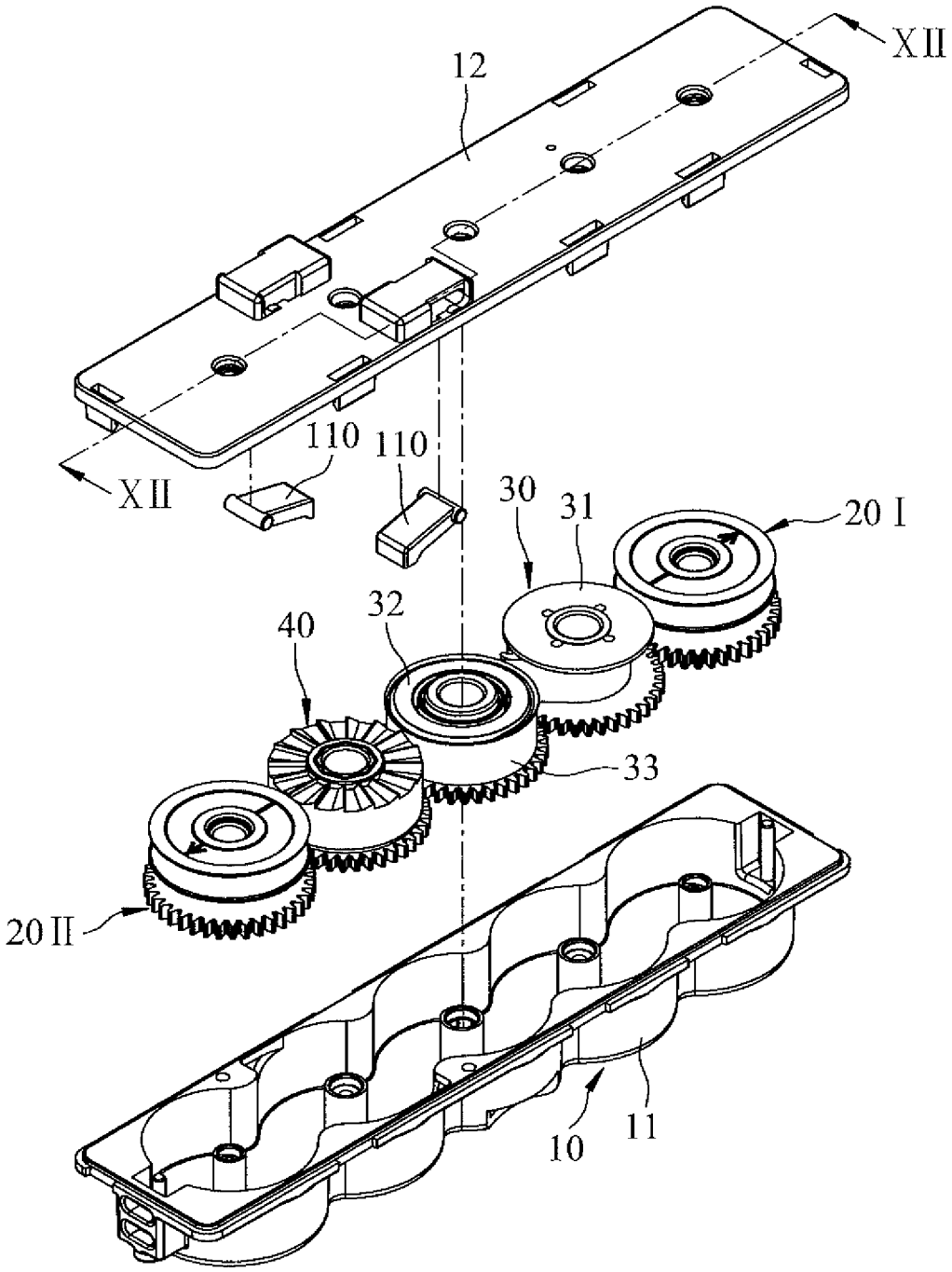


FIG.10

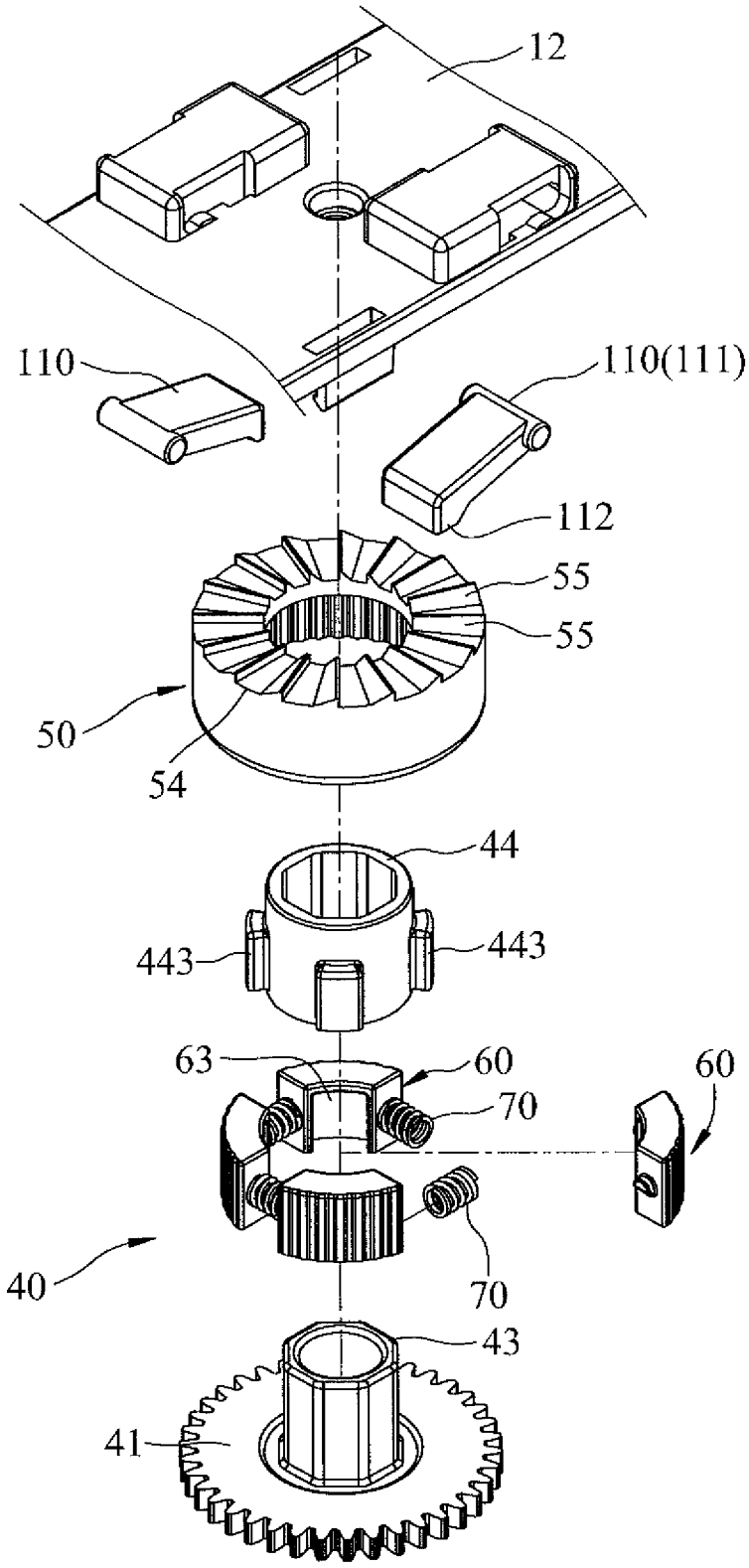


FIG.11

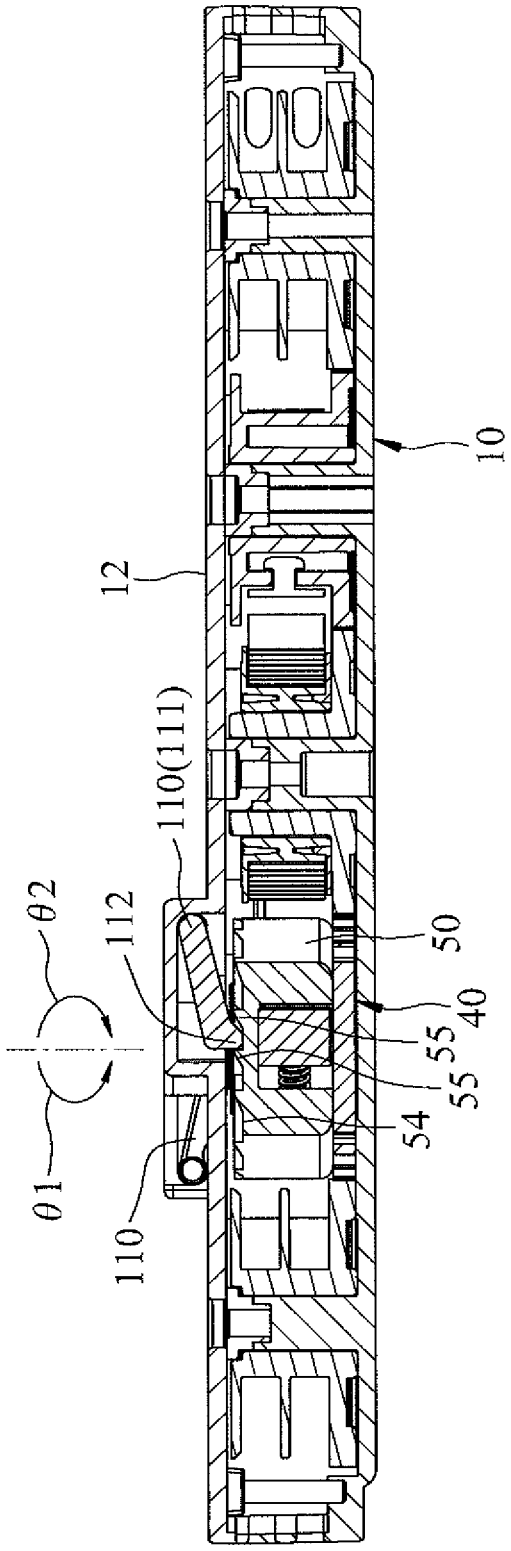


FIG.12

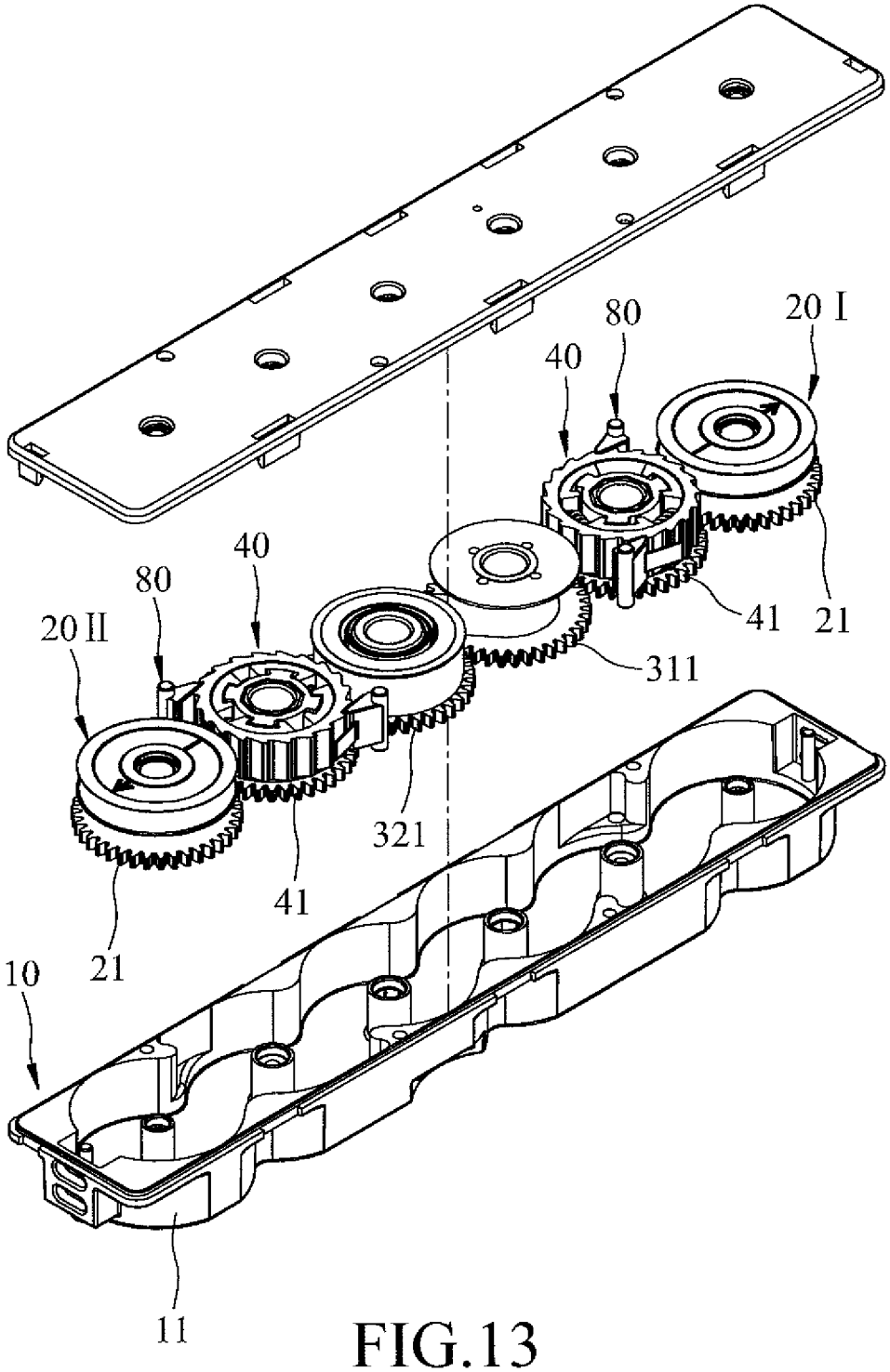


FIG.13

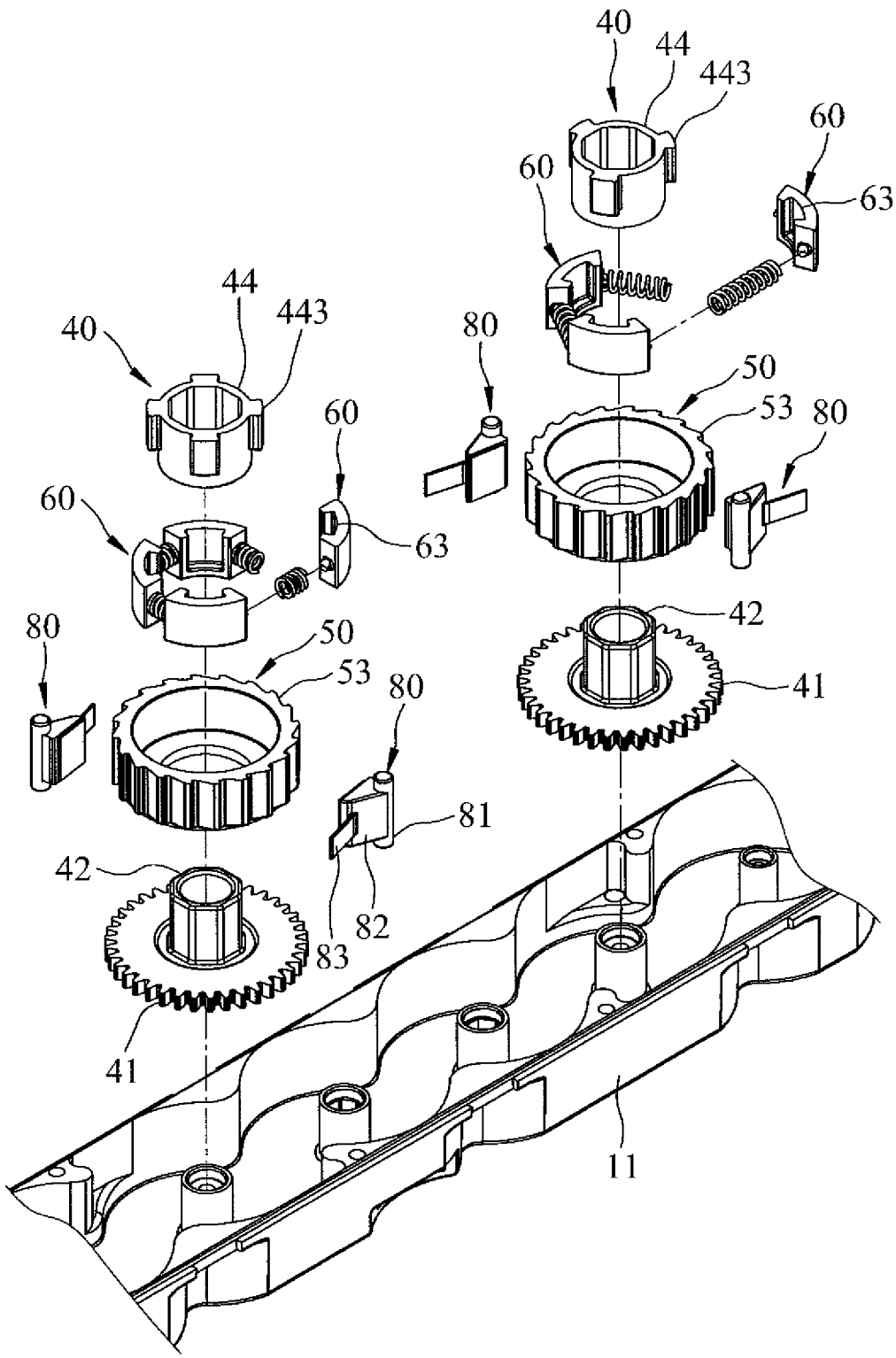


FIG.14

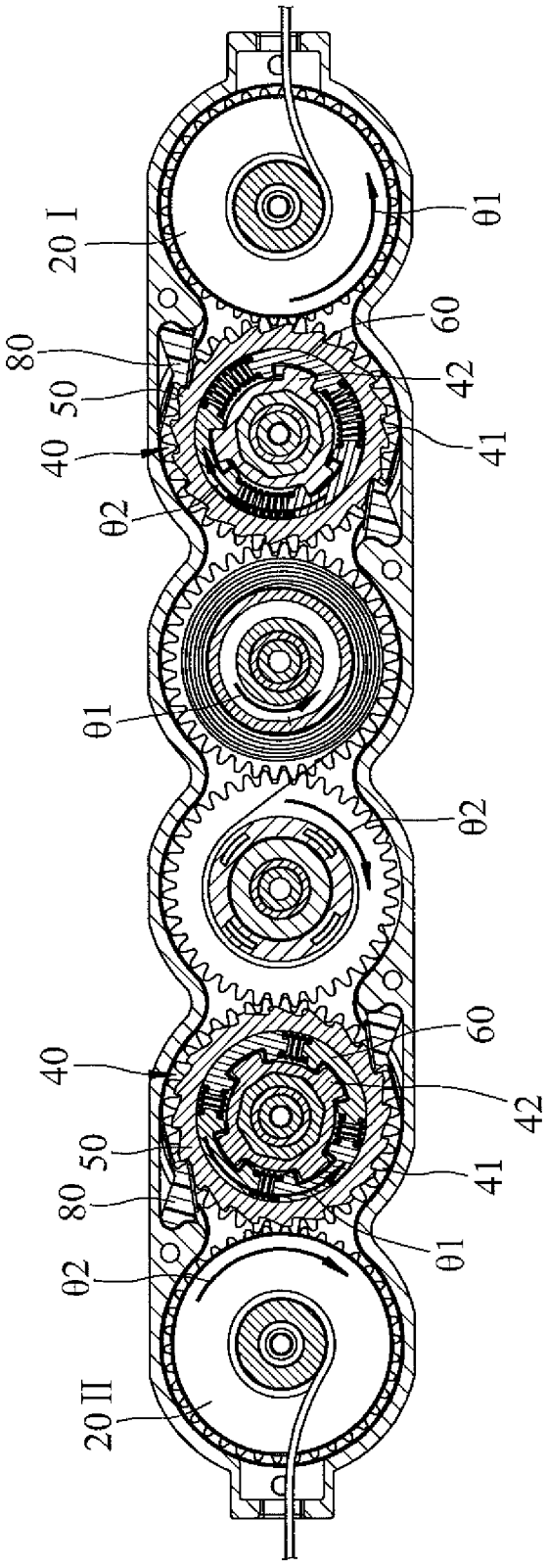


FIG.15

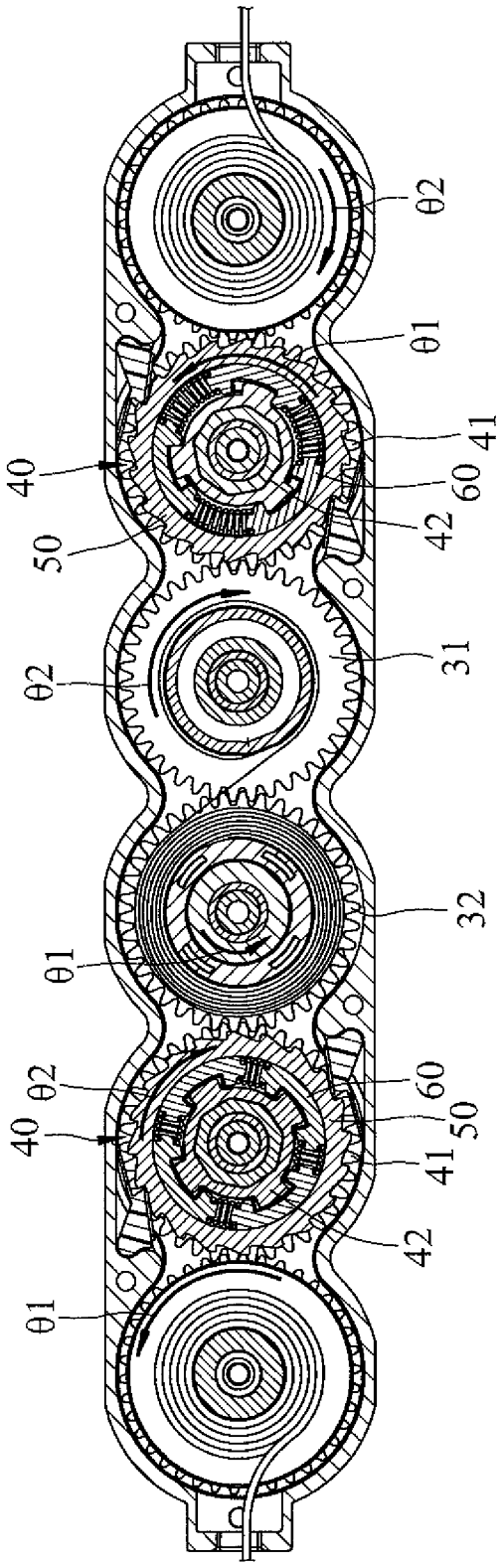


FIG.16

CORD-WINDING DEVICE FOR A VENETIAN BLIND

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority of Chinese Application No. 201320141523.9, filed on Mar. 26, 2013.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a Venetian blind, and more particularly to a cord-winding device for a Venetian blind having a brake unit and a pull cord unit that is not directly operated.

2. Description of the Related Art

Referring to FIGS. **1** and **2**, a Venetian blind disclosed in Taiwanese Utility Model Patent Publication Number 363667 includes a head rail **1**, a bottom rail **2**, a plurality of slats **3**, two pull cords **4**, a winding unit **5**, and a positioning unit **6**. The winding unit **5** includes a casing **501** disposed within the bottom rail **2**, two cord-winding members **502** disposed rotatably within the casing **501**, and two spiral springs **503** connected between the cord-winding members **502** and the casing **501**. Each of the cord-winding members **502** has a winding portion **504** permitting the corresponding pull cord **4** to be wound thereon, and a engaging portion **505** formed with continuous teeth. The positioning unit **6** includes a braking member **601** and a plurality of springs **602** disposed between and abutting against the casing **501** and the braking member **601**. The braking member **601** has two rack portions **603** meshing with the engaging portions **505**.

When it is desired to close the slats **3**, the braking member **601** is pressed to remove the rack portions **603** from the engaging portions **505**. At this time, if the bottom rail **2** is pushed upwardly, the pull cords **4** will be wound around the cord-winding members **502** by virtue of return force of the spiral springs **503**, so that the slats **3** are superposed on the bottom rail **2**. Conversely, if the bottom rail **2** is pulled downwardly, the pull cords **4** are unwound from the cord-winding members **502** so that the slats **3** are opened. When the bottom rail **2** is lowered to a desired height, the braking member **601** is released to allow the rack portions **603** to engage the engaging portions **505** to thereby stop rotation of the cord-winding members **502**. In this manner, the bottom rail **2** can be maintained at any desired height.

As such, the positioning unit **6** is operable to control rotation of the cord-winding members **502**. However, in actual use, since the winding unit **5** and the positioning unit **6** are disposed in a middle portion of the bottom rail **2**, and since the user needs to press the braking member **601** and push upwardly or pull downwardly the bottom rail **2** with one hand, the bottom rail **2** cannot be held in a balance manner. As a result, the cord-winding members **502** cannot wind the pull cords **4** synchronously, so that the bottom rail **2** is apt to recline, thereby resulting in inconvenience during use and operation.

SUMMARY OF THE INVENTION

The object of this invention is to provide a cord-winding device for a Venetian blind, which is convenient to operate.

According to this invention, a cord-winding device for a Venetian blind includes: a first reel; a driving unit including a driving wheel and a spring-winding wheel; and a brake unit including a driven gear, a driving member, a ratchet wheel sleeved on the driving member, a plurality of friction members disposed between the driving member and the ratchet wheel, and at least one pawl biased to engage the ratchet wheel. When the driven gear is driven by the first reel to rotate in a direction, rotation of the ratchet wheel is stopped by the pawl so that the driving member drives the friction members to rotate, and when the driven gear is driven by the driving wheel to rotate in an opposite direction, the driving member drives rotation of the friction members and, thus, the ratchet wheel.

As such, the pull cords can be wound or unwound without operating directly the brake unit. That is, the cord-winding device is convenient to operate.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features and advantages of this invention will become apparent in the following detailed description of the preferred embodiments of this invention, with reference to the accompanying drawings, in which:

FIG. **1** is a schematic view of a conventional cord-winding device for a Venetian blind;

FIG. **2** is a sectional view taken along line II-II in FIG. **1**;

FIG. **3** is a schematic view of the first preferred embodiment of a cord-winding device for a Venetian blind according to this invention;

FIG. **4** is a partly exploded perspective view of the first preferred embodiment;

FIG. **5** is a partly exploded perspective view of a brake unit of the first preferred embodiment;

FIG. **6** is a sectional view of the preferred embodiment;

FIG. **7** is a sectional view taken along line VII-VII in FIG. **6**;

FIG. **8** is a view similar to FIG. **6** but illustrating that two pull cords are pulled outwardly to rotate a driven gear of the brake unit in a first direction;

FIG. **9** is a view similar to FIG. **6** but illustrating that the pull cords are returned to their original positions to thereby rotate the driven gear of the brake unit in a second direction;

FIG. **10** is a partly exploded perspective view of the second preferred embodiment of a cord-winding device for a Venetian blind according to this invention;

FIG. **11** is a partly exploded perspective view of a brake unit of the second preferred embodiment;

FIG. **12** is a sectional view taken along line XII-XII in FIG. **10**;

FIG. **13** is a partly exploded perspective view of the third preferred embodiment of a cord-winding device for a Venetian blind according to this invention;

FIG. **14** is a fragmentary exploded perspective view of the third preferred embodiment;

FIG. **15** is a sectional view of the third preferred embodiment, illustrating that the cord-winding gears of first and second reels are rotated in first and second directions, respectively; and

FIG. **16** is a sectional view of the third preferred embodiment, illustrating that the cord-winding gears of first and second reels are rotated in second and first directions, respectively.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Before the present invention is described in greater detail in connection with the preferred embodiments, it should be noted that similar elements and structures are designated by like reference numerals throughout the entire disclosure.

Referring to FIG. **3**, the first preferred embodiment of a cord-winding device **100** according to this invention is mounted to a Venetian blind. The blind includes a head rail **200**, a bottom rail **300**, a plurality of slats **400**, and two pull cords **500**. Top ends of the pull cords **500** are connected to the cord-winding device **100**. The pull cords **500** extend through the slats **400** to connect with the bottom rail **300**. For convenience of illustration, a ladder string unit for hanging the slats **400** is not shown in FIG. **3**.

With additional reference to FIG. **4**, the cord-winding device **100** includes a casing unit **10**, a cord-winding unit, a first reel **201**, a second reel **20**II, a driving unit **30**, and a brake unit **40**.

The casing unit **10** includes a hollow bottom seat **11** and a top cover **12** disposed on the bottom seat **11**.

With further reference to FIG. **6**, the cord-winding unit includes a first reel **201** and a second reel **20**II. The first and second reels **20**I, **20**II are disposed rotatably in the casing unit **10**. Each of the first and second reels **20**I, **20**II has a cord-winding gear **21**, and a cord-receiving portion **22** disposed on the cord-winding gear **21**. The top ends of the pull cords **500** are connected respectively to the cord-receiving portions **22** of the first and second reels **20**I, **20**II in such a manner that, when the bottom ends of the pull cords **55** are pulled downwardly to unwind the top ends of the pull cords **55** from the first and second reels **20**I, **20**II, the first and second reels **20**I, **20**II rotate in the same direction.

The driving unit **30** includes a driving wheel **31** disposed rotatably in the casing unit **10**, a spring-winding wheel **32** disposed rotatably in the casing unit **10**, and a spiral spring **33** connected between the driving wheel **31** and the spring-winding wheel **32**. The driving wheel **31** has a driving gear **311**, and a spring-receiving portion **312** disposed on the driving gear **311**. The spring-winding wheel **32** has a spring-winding gear **321** meshing with the driving gear **311**, and a spring-receiving portion **322** disposed on the spring-winding gear **321**. In this embodiment, the cord-winding gear **21** of the first reel **201** meshes with the driving gear **311** of the driving wheel **31**. The spiral spring **33** is fastened to the spring-receiving portion **312** at one end thereof, and is wound around the spring-receiving portion **322** at the other end thereof. When the spiral spring **33** is not subjected to any external force, a major portion thereof is wound around the spring-receiving portion **322**.

With particular reference to FIGS. **5**, **6**, and **7**, the brake unit **40** includes a driven gear **41** disposed rotatably in the bottom seat **11** of the casing unit **10**, a driving member **42** disposed fixedly and coaxially on the driven gear **41**, a ratchet wheel **50** sleeved on the driving member **42**, a plurality of friction members **60** disposed between the driving member **42** and the ratchet wheel **50**, a plurality of resilient members **70** each disposed between two adjacent friction members **60**, two pawls **80** disposed in the casing unit **10** and engaging the ratchet wheel **50**, two torsion springs **90**, and an annular cover **93** disposed between the driving member **42** and a top end of the ratchet wheel **50**. Alternatively, the brake unit **40** may include only one pawl **80**.

The driven gear **41** meshes with the spring-winding gear **321**. In this embodiment, the cord-winding gear **21** of the second reel **20**II meshes with the driven gear **41**.

The driven gear **41** can rotate in opposite first and second directions θ**1**, θ**2**. In this embodiment, the first direction θ**1** is counterclockwise, and the second direction θ**2** is clockwise.

The driving member **42** includes a shaft rod **43** that is disposed coaxially on the driven gear **41** and that is non-circular in cross-section, and a bushing **44** sleeved on the shaft rod **43**. In this embodiment, the driving member **42** is formed integrally with the driven gear **41**.

The bushing **44** receives fittingly the shaft rod **43**, and has an inner peripheral surface **441** in intimate contact with the shaft rod **43**, an outer peripheral surface **442**, and a plurality of first engaging portions **443** disposed on the outer peripheral surface **442** and spaced apart from each other. In this embodiment, the first engaging portions **443** are configured as projections, and are arranged in four angularly equidistant pairs each arranged one above the other.

The ratchet wheel **50** includes a splined inner peripheral surface **51** formed with a plurality of spline grooves, an outer peripheral surface **52**, and a plurality of ratchet teeth **53** disposed on the outer peripheral surface **52**.

Each of the friction members **60** has an inner side surface **61**, an outer side surface **62**, two second engaging portions **63** each engaging the corresponding first engaging portion **443**, and two end surfaces **64** connected between the inner and outer side surfaces **61**, **62**. In this embodiment, the outer peripheral surfaces **62** of the friction members **60** are toothed, and have teeth each engaging the corresponding spline groove in the inner peripheral surface **51** of the ratchet wheel **50**. The second engaging portions **63** of the friction members **60** engage respectively the first engaging portions **443**. It should be noted that, if a sufficient frictional force occurs between the ratchet wheel **50** and the friction members **60**, the inner peripheral surfaces **51** of the ratchet wheel **50** and the outer side surfaces **62** of the friction members **60** will not have teeth.

The resilient members **70** bias the outer side surfaces **62** of the friction members **60** to contact the inner peripheral surface **51** of the ratchet wheel **50**. In this embodiment, each of the resilient members **70** is disposed between the corresponding end surfaces **64** of the friction members **60**, and is configured as a compression spring. As such, the friction members **60** are biased to contact intimately the ratchet wheel **50** by the resilient members **70**, so as to create static frictional force therebetween, thereby transferring rotation of the driven gear **41** to the ratchet wheel **50**. Otherwise, the resilient members **70** can be compressed to allow inward movement of the friction members **60** to thereby prevent synchronous rotation of the friction members **60** with the ratchet wheel **50**, so as to prevent rotation of the ratchet wheel **50**, while maintaining contact between the ratchet wheel **50** and the friction members **60**.

Each of the pawls **80** has a shaft portion **81** disposed pivotally in the casing unit **10**, and a finger portion **82** extending inwardly from the shaft portion **81**.

Each of the torsion springs **90** is disposed between the casing unit **10** and the corresponding pawl **90**, and is sleeved on the shaft portion **81** of the corresponding pawl **80**. Each of the torsion springs **90** has a first end **91** inserted fixedly into a wall of the casing unit **10**, and a second end **92** abutting against the corresponding pawl **90**, so as to bias the finger portion **82** of the corresponding pawl **80** to contact the ratchet teeth **53** of the ratchet wheel **50**. When the ratchet wheel **50** rotates in the first direction θ**1**, the finger portions **82** of the pawls **80** contact radially extending surfaces of the ratchet teeth **53** to prevent further rotation of the ratchet wheel **50** in the first direction θ**1**. Conversely, when the ratchet wheel **50** rotates in the second direction θ**2**, the finger portions **82** of the pawls **80** contact inclined surfaces of the ratchet teeth **53** to allow further rotation of the ratchet wheel **50** in the second direction θ**2**.

The annular cover **93** cooperates with the casing unit **10** to conceal the friction members **60** and the resilient members **70** therebetween.

With particular reference to FIGS. **3** and **6**, during operation of the cord-winding device **100**, to stop the bottom rail **300** at any desired height, it is necessary to satisfy the following two requirements:

1. In a situation where the slats **400** are fully opened, when no external force is applied thereto, the biasing force of the spiral spring **33** is not greater than the pulling force applied by the bottom rail **300** and the slats **400** to the pull cords **500**; and

2. In a situation where the slats **400** are fully closed, when no external force is applied thereto, sum of the biasing force of the spiral spring **33** and static frictional force occurring between the ratchet wheel **50** and the friction members **60** is not less than the pulling force applied by the bottom rail **300** and the slats **400** to the pull cords **500**.

With particular reference to FIGS. **3**, **7**, and **8**, when it is desired to open the slats **400**, a force is applied to pull the bottom rail **300** downwardly to thereby move the pull cords **500** outwardly, so as to allow the first and second reels **20**I, **20**II to have a tendency to rotate in the second direction θ**2**. Hence, the cord-winding gear **21** of the second reel **20**II tends to drive the driven gear **41** to rotate in the first direction θ**1**. At this time, when the torque applied to the driven gear **41** is too small to overcome the frictional force occurring between the ratchet wheel **50** and the friction members **60**, due to engagement between the finger portions **82** of the pawls **80** and the ratchet teeth **53**, the ratchet wheel **50** cannot rotate. When the torque applied to the driven gear **41** is increased such that it is great enough to overcome the frictional force occurring between the ratchet wheel **50** and the friction members **60**, due to engagement between the first engaging portions **443** of the driving member **42** and the second engaging portions **63** of the friction members **60**, rotation of the friction members **60** relative to the ratchet wheel **50** is allowed. When the torque applied to the driven gear **41** is further increased such that it is great enough to overcome the biasing force of the spiral spring **33**, the driven gear **41** drives rotation of the spring-winding gear **321** of the spring-winding wheel **32** in the second direction θ**2**, and the cord-winding gear **21** of the first reel **20**I drives rotation of the driving gear **311** of the driving wheel **31** in the first direction θ**1**, so as to wind gradually the spiral spring **33** around the driving wheel **31**. As soon as the bottom rail **300** is released, since no external force is applied, the bottom rail **300** and the slats **400** are stopped, such that the bottom rail **300** is stopped at a desired height.

With particular reference to FIGS. **3**, **7**, and **9**, when it is desired to close the slats **400**, a force is applied to push the bottom rail **300** upwardly, so that the driving gear **311** of the driving wheel **31** is biased by the spiral spring **33** to rotate in the second direction θ**2** to thereby rotate the spring-winding gear **321** of the spring-winding wheel **32** and the spring-winding gear **21** of the first reel **201** in the first direction θ**1**. At this time, the spiral spring **33** is wound gradually around the spring-winding wheel **32**, and the driven gear **41** is driven by the spring-winding gear **321** of the spring-winding wheel **32** to rotate in the second direction θ**2**, thereby rotating the spring-winding gear **21** of the second reel **20**II in the first direction θ**1**. At the same time, since the driven gear **41** rotates the driving member **42** to drive rotation of the friction members **60** and, thus, the ratchet wheel **50** in the second direction θ**2**, the ratchet teeth **53** can slide past the finger portions **82** of the pawls **80** (i.e., the pawls **80** cannot obstruct rotation of the ratchet wheel **50**). Consequently, the first and second reels **20**I, **20**II are rotated to wind the pull cords **500** therearound. During this process, when the bottom rail **300** is released, since no external force is applied, the bottom rail **300** can be stopped at any desired position.

As such, the slats **400** can be opened or closed by moving the bottom rail **300** downwardly or upwardly, so that the cord-winding device **100** is convenient to operate. Furthermore, since the pull cords **500** are moved by synchronous rotation of the first and second reels **20**I, **20**II in the same direction, reclination of the bottom rail **300** can be prevented effectively.

FIGS. **10**, **11**, and **12** show the second preferred embodiment of a cord-winding device for a Venetian blind according to this invention, which differs from the first preferred embodiment in the following.

In this embodiment, the torsion springs **90** (see FIG. **5**) and the annular cover **93** (see FIG. **5**) are omitted from the brake unit **40**, and the pawls **80** (see FIG. **5**) are replaced with two modified pawls **110**.

The bushing **44** of the driving member **42** has only a plurality of angularly equidistant first engaging portions **443**.

Each of the friction members **60** has only a second engaging portion **63**.

The ratchet wheel **50** has an annular top surface **54**, and a plurality of ratchet teeth **55** disposed on the annular top surface **54** and spaced apart from each other.

Each of the pawls **110** has a pivotal portion **111** disposed pivotally on the top cover **12**, and a finger portion **112** biased to engage the ratchet teeth **55** of the ratchet wheel **50**. In this embodiment, the pawls **110** is biased to engage the ratchet teeth **55** with the fingers **112** by virtue of the gravity itself.

When the ratchet wheel **50** rotates in the first direction θ**1**, the fingers **112** of the pawls **110** contact radially extending surfaces of the ratchet teeth **55** to prevent rotation of the ratchet wheel **55**. Conversely, when the ratchet wheel **50** rotates in the second direction θ**2**, the finger portions **112** of the pawls **110** contact inclined surfaces of the ratchet wheel **50**, thereby allowing for rotation of the ratchet wheel **50**.

As a consequence, the second preferred embodiment can achieve the same object and effect as the first preferred embodiment.

Referring to FIGS. **13** and **14**, the third preferred embodiment of a cord-winding device according to this invention differs from the first preferred embodiment in the following.

In this embodiment, the cord-winding device includes two brake units **40**, and the torsion springs **90** (see FIG. **5**) are omitted from the brake units **40**.

The driven gear **41** of the right brake unit **40** is disposed between and meshes with the cord-winding gear **21** of the first reel **20**I and the driving gear **311**. The right brake unit **40** includes three friction members **60**.

The driven gear **41** of the left brake unit **40** is disposed between and meshes with the cord-winding gear **21** of the second reel **20**II and the spring-winding gear **321**. The left brake unit **40** includes four friction members **60**. The inclination directions of the ratchet wheels **50** of the brake units **40** are opposite to each other.

The bushing **44** of the driving member **42** of each of the brake units **40** has three angularly equidistant first engaging portions **443**. Each of the friction members **60** has a second engaging portion **63** that engages the corresponding first engaging portion **443** of the corresponding bushing **44**.

The pawl **80** of each of the brake units **40** has a shaft portion **81** disposed pivotally on the casing unit **10**, a finger portion **82** extending from the shaft portion **81**, and a spring plate **83** disposed on the finger portion **82** and abutting against an inner wall surface of the base **11** of the casing unit **10** for biasing the finger portion **82** to engage the ratchet teeth **53** of the ratchet wheel **50**.

As such, with particular reference to FIG. **15**, when the first and second reels **20**I, **20**II drive the driven gears **41** of the

brake units **40** to rotate in the second and first directions θ**2**, θ**1**, respectively, the pawls **80** stop rotation of the ratchet wheels **50**, so that rotation of the friction members **60** relative to the ratchet wheels **50** is allowed. With particular reference to FIG. **16**, when the driving wheel **31** and the spring-winding wheel **32** drive the driven gears **41** of the brake units **40** to rotate in the first and second directions θ**1**, θ**2**, respectively, the ratchets **50** are driven by the friction members **60** to rotate respectively and synchronously with the driving members **42**. As a consequence, the third preferred embodiment can achieve the same object and effect as the first preferred embodiment.

With this invention thus explained, it is apparent that numerous modifications and variations can be made without departing from the scope and spirit of this invention. It is therefore intended that this invention be limited only as indicated by the appended claims.

I claim:

1. A cord-winding device adapted for use in a Venetian blind, comprising:

a casing unit;

a cord-winding unit disposed rotatably in said casing unit and provided with at least one cord-winding gear;

a driving unit including a driving wheel disposed rotatably in said casing unit and having a driving gear, a spring-winding wheel disposed rotatably in said casing unit and having a spring-winding gear, and a spiral spring connected between said spring-winding wheel and said driving wheel, said driving wheel meshing with said spring-winding wheel; and

at least one brake unit including a driven gear disposed rotatably in said casing unit and meshing with said spring-winding gear, a driving member disposed coaxially on said driven gear, a ratchet wheel sleeved on said driving member, a plurality of friction members disposed between said driving member and said ratchet wheel, a plurality of resilient members each disposed between two adjacent ones of said friction members, and at least one pawl disposed on said casing unit and biased to engage said ratchet wheel, said driven gear meshing with said spring-winding gear of said driving unit, said cord-winding unit meshing with at least one of said driven gear and said driving gear of said driving unit, said driven gear being rotatable in a first direction or a second direction, each of said friction members being movable between said driving member and said ratchet wheel, said resilient members biasing said friction members into contact with said ratchet wheel such that, when said driven gear is driven by said cord-winding unit to rotate in one of said first and second directions, rotation of said ratchet wheel is stopped by said pawl so that said driving member drives said friction members to rotate, and when said driven gear is driven by said driving wheel to rotate in the other one of said first and second directions, said driving member drives rotation of said ratchet wheel via friction members.

2. The cord-winding device as claimed in claim **1**, wherein:

said cord-winding unit includes a first reel provided with said cord-winding gear;

said driving wheel has a driving gear;

said spring-winding wheel has a spring-winding gear meshing with said driving gear;

said cord-winding gear meshes with one of said driven gear and said driving gear;

said driving member has a plurality of first engaging portions;

each of said friction members has at least one second engaging portion that engages a respective one of said first engaging portions;

when said driven gear is driven by said first reel to rotate in said first direction, rotation of said ratchet wheel is stopped by said pawl so that said driving member drives said friction members to rotate; and

when said driven gear is driven by said driving wheel to rotate in said second direction, said driving member drives rotation of said ratchet wheel via said friction members.

3. The cord-winding device as claimed in claim **2**, wherein said cord-winding unit further includes a second reel, said cord-winding gear of said first reel meshing with said driving gear of said driving wheel, said second reel being disposed rotatably in said casing unit and being provided with a cord-winding gear that meshes with said driven gear.

4. The cord-winding device as claimed in claim **3**, wherein said driving member further has a shaft rod that is non-circular in cross-section and that is disposed coaxially on said driven gear, and a bushing sleeved on said shaft rod for receiving fittingly said shaft rod, said bushing having an outer peripheral surface, said first engaging portions being disposed on said outer peripheral surface of said bushing and being spaced apart from each other.

5. The cord-winding device as claimed in claim **4**, wherein said first engaging portions are configured as projections, each of said friction members having opposite inner and outer side surfaces, said second engaging portions of said friction members being configured as grooves that are formed respectively in said inner side surfaces of said friction members.

6. The cord-winding device as claimed in claim **5**, wherein said ratchet wheel has a splined inner peripheral surface formed with a plurality of spline grooves, said outer side surfaces of said friction members being toothed and having teeth each engaging a corresponding one of said spline grooves in said inner peripheral surface of said ratchet wheel.

7. The cord-winding device as claimed in claim **5**, wherein each of said friction members further has two end surfaces connected between said inner and outer side surfaces, each of said resilient members being disposed between two corresponding ones of said end surfaces of said two adjacent ones of said friction members.

8. The cord-winding device as claimed in claim **3**, wherein said driving unit further includes two torsion springs and two said pawls, said pawls being disposed pivotally on said casing unit, said ratchet wheel having an outer peripheral surface, and a plurality of ratchet teeth disposed on said outer peripheral surface of said ratchet wheel, said torsion springs being disposed between said housing unit and said pawls for biasing said pawls to engage said ratchet teeth of said ratchet wheel.

9. The cord-winding device as claimed in claim **8**, wherein each of said pawls has a shaft portion disposed pivotally in said casing unit, and a finger portion disposed on said shaft portion, said torsion springs being sleeved respectively on said shaft portions, each of said torsion springs having a first end connected to said casing unit, and a second end abutting against said finger portions of a corresponding one of said pawls.

10. The cord-winding device as claimed in claim **8**, wherein said brake unit further includes a cover that is configured as a ring plate and that is disposed between said driving member and a top end of said ratchet wheel for concealing said friction members and said resilient members thereamong.

11. The cord-winding device as claimed in claim **3**, wherein said casing unit includes a hollow bottom seat and a

top cover disposed on said bottom seat, said brake unit including two said pawls, said ratchet wheel having an annular top surface and a plurality of ratchet teeth disposed on said annular top surface and spaced apart from each other, each of said pawls having a pivotal portion disposed pivotally on said top cover, and a finger portion biased to engage said ratchet teeth of said ratchet wheel.

12. The cord-winding device as claimed in claim **1**, wherein:

said cord-winding device comprises two said brake units;

said cord-winding unit includes a first cord-winding reel and a second cord-winding reel that are disposed in said casing unit, each of said first and second reels having one said cord-winding gear;

said driven gear of one of said brake units is disposed between and meshes with said cord-winding gear of said first reel and said driving gear, said driven gear of the other of said brake units is disposed between and meshes with said cord-winding gear of said second reel and said spring-winding gear;

said driving member of each of said brake units has a plurality of first engaging portions, said friction members of each of said brake units having at least one second engaging portion that engages a corresponding one of said first engaging portions; and

when said first and second reels rotate said driven gears of said brake units in said second and first directions, respectively, said pawls of said brake units stop rotation of said ratchet wheel, so as to allow for rotation of said friction members relative to said ratchet wheels; and

when said driving wheel and said spring-winding wheel rotate said driven gears of said brake units in said first and second directions, respectively, said ratchet wheels of said brake units are driven by said friction members of said brake units to rotate respectively and synchronously with said driving members.

13. The cord-winding device as claimed in claim **12**, wherein each of said brake units includes two pawls, each of said pawls having a shaft portion disposed pivotally on said casing unit, a finger portion extending from said shaft portion, and a spring plate disposed on said finger portion and abutting against said casing unit, said ratchet wheel of each of said brake units having an outer peripheral surface, and a plurality of ratchet teeth disposed on said outer peripheral surface, said spring plate of each of said pawls of each of said brake units biasing said finger portion of said pawl to engage said ratchet teeth of said ratchet wheel of said brake units.

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